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How Does On-farm Nursery Pig Approachability Pre- and Post-vaccination?

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Summary and Implications

The objective of this study was to compare live and digital methodologies to measure nursery pig approachability pre- and post-vaccination. A total of 149 pens housing approximately 19 barrows and gilts/pen (a mix of approximately 50% barrows and 50% gilts; 0.3 m²/pig) were used. Pigs were approximately 6 weeks of age. The pen applied injection treatments were (1) Ingelvac CircoFLEX[®]/Ingelvac MycoFLEX[®] vaccine, (2) Circumvent[®] PCVM vaccine (3) Saline. **Pre-injection** were conducted at 1600h the day before injections were administered. Pigs received their treatments at 1000h on the consecutive day and **post-injection** was conducted, 6 h after treatments were administered and 24 h after pre-injection observations. An animal-human interaction tests was completed at pre- and post-injection time points using a live- and digital image methodology. The experimental unit was the pen of pigs. The statistical model evaluating methodologies used PROC GLIMMIX. A $P \leq 0.05$ value was considered to be significant. There were no pre- or post-injection approach and not differences comparing the live and digital image evaluation methodologies. In conclusion, the live observation information is very useful when considering a real-time human-animal based measure during an on-farm assessment.

Introduction

When an animal is placed into a situation that it perceives as threatening it can react internally via physiological changes and externally using behavior. Animals can react in one of three ways; fight, flight, or freeze. Common husbandry procedures that improve animal welfare may be perceived by the animal as “aversive” for example vaccinations. Animal-human interaction tests have been used to determine the relative aversion for a procedure or situation and how long this aversion lasts. Weimer and colleagues (2014) compared a live- versus digital image

methodology to classify pigs touching, orientating to a human or neither (Not). This work showed that when using the live methodology, more pigs were classified as orientated and fewer not. What remains unknown is how these two methodologies compare to each other when nursery pigs are given a vaccine. Therefore, the objective of this study was to compare live and digital methodologies to measure nursery pig approachability pre- and post-vaccination.

Materials and Methods

Animal care and husbandry protocols for this experiment were overseen by the company veterinarian and farm manager. These protocols were based on the U.S. swine industry guidelines presented in the Swine Care Handbook and the Pork Quality Assurance Plus[™] (2010). In addition, all procedures were approved by the Iowa State University IACUC committee.

Animals and location: A total of 149 pens housing ~19 barrows and gilts/pen (a mix of approximately 50% barrows and 50% gilts; 0.3 m²/pig) were housed in four rooms within 2 barns (2 rooms in each barn). Barrows and gilts were approximately 6-wk of age from a commercial crossbred genetic line. The experiment was conducted in November 2011 at a commercial nursery site located near St. Joseph, Missouri.

Diets, housing and husbandry: Pens measured 1.8 m width x 3 m length with steel dividers. Pens were situated with 10 pens on the right, 10 on the left and 20 in the center separated by two alleyways (91.4 cm wide). Feeders were located on the right or left side of the pen. Pigs were provided *ad-libitum* access to a pelleted diet (1549 kcal per kg metabolizable energy and 22% crude protein) formulated to meet or exceed NRC 2010) nutrient requirements. Each pen contained one stainless steel nipple drinker that was positioned between pens and opposite the feeder. Wire flooring was utilized in all pens. Average room temperature was 24°C. Caretakers observed all pigs twice daily.

Animal-human interaction methodology: Upon entry to the nursery room the observer and the digital image photographer walked down the length of the nursery room to the farthest pen on the right side of the alleyway. The observer quietly set the nursery pen image capturing device at the midpoint at the front gate of the adjacent pen across the 91.4 cm alleyway and quietly stepped over and entered the nursery pen. In conjunction, the photographer quietly sat on a bucket behind the observer and leaned back on the front pen gate. At the conclusion of the 15-s period, the

observer signaled to the photographer, by leaning back against the front gate, for the photographer to capture a digital image using a wireless remote.

Nursery pen image capturing device: The device location was free-standing across the alleyway from each pen gate where the live human assessment occurred. A 2.5 cm radius PVC connector, and a second 40 cm height PVC pipe was added to the top of the 1.6 m height PVC pipe to create a total nursery pen image capturing device height of 2.0 m. The tripod head was angled at 47 degrees relative to the vertical PVC pipe. The camera was angled at 50 degrees relative to the horizontal tripod head and was secured into position.

Injection treatment: The pen applied injection treatments were (1) Ingelvac CircoFLEX®/Ingelvac MycoFLEX® vaccine (Boehringer Ingelheim Vetmedica Inc., St. Joseph, Missouri), (2) Circumvent® PCVM vaccine (Merck, Whitehouse Station, New Jersey) and (3) Saline (Hyclone Phosphate Buffered Saline, Sigma Aldrich, St. Louis, Missouri).

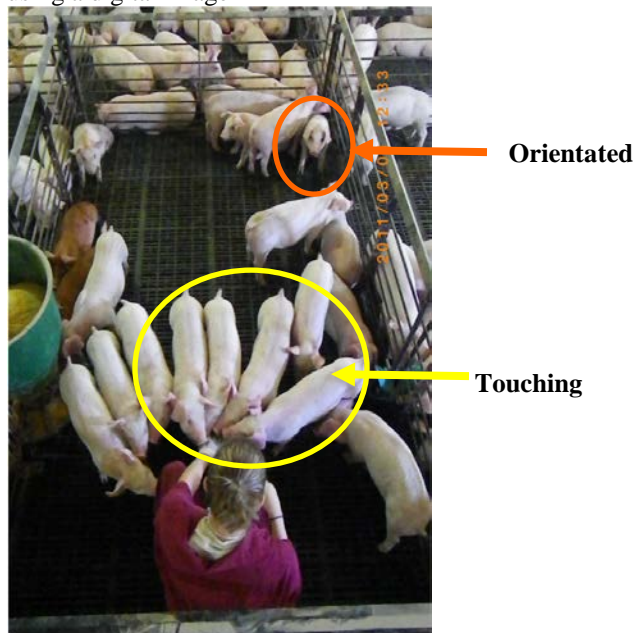
Injection methodology: Pens were assigned a treatment in an alternating fashion across the alleyway. The same technician performed vaccination procedures for all treatments. Pigs were moved by a sort board towards the alley end of their home pen. Pigs were not individually handled in an effort to avoid any additional handling stressors on the pigs. To avoid injecting the same pig twice, a mark was placed between the pig's scapula's using an animal-safe crayon after injection. **Pre-injection** were conducted at 1600h the day before injections were administered. Pigs received their treatments at 1000h on the consecutive day and **post-injection** was conducted, 6 h after treatments were administered and 24 h after pre-injection observations.

Measures: Pre- and post-injection behavior was classified as either live approach digital approach or not (Table 1).

Table 1. Approach vs. not using a live or digital image methodology

Measure	Description
Live approach	Any part of the pig's body touching the human observer and any pig orientated toward the human.
Digital approach	Any part of the pig's body touching the human observer and any pig orientated toward the human ¹ .
Not	All pigs not classified as Approach within either methodology.

Figure 1. Classifying *Touching* and *Orientated* and not using a digital image¹



¹For the digital image, using Adobe Photoshop, a line was drawn from the midpoint between the pig's eyes to the center of the snout, then extended towards the edge of the pen. If the line intersected the human, the pig was also classified as digital approach.

Statistical Analysis: Researchers were blind to injection treatments until the data had been collected and statistical models were confirmed by a statistician. The experimental unit was the pen of pigs. All data were evaluated for normal distribution before analysis by using the PROC UNIVARIATE procedure of SAS. The statistical model evaluating methodologies used PROC GLIMMIX including the fixed effect of methodology (live vs. digital) and random effects of barn and room nested within pen. A $P \leq 0.05$ value was considered to be significant.

Results and Discussion

There were no pre- or post-injection approach and not differences comparing the live and digital image evaluation methodologies (Table 2). In conclusion, the live observation information is very useful when considering a real-time human-animal based measure during an on-farm assessment.

Acknowledgements

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Table 2. Nursery pig approach and not means (\pm SE) pre- and post-injection from live and digital image evaluation when housed in commercial conditions.

No. pens	Methodology		P-value
	Live	Digital	
	149	149	
<i>Pre-injection</i>			
Approach, no. pigs/pen	9.1 \pm 0.2	8.9 \pm 0.2	0.13
Approach, % pigs/pen	45.2 \pm 1.0	44.1 \pm 1.0	0.13
Not, no. pigs/pen	11.1 \pm 0.2	11.2 \pm 0.2	0.13
Not, % pigs/pen	54.9 \pm 1.0	55.9 \pm 1.0	0.13
<i>Post-injection</i>			
Approach, no. pigs/pen	7.5 \pm 0.2	7.7 \pm 0.2	0.15
Approach, % pigs/pen	37.2 \pm 1.2	38.2 \pm 1.2	0.11
Not, no. pigs/pen	12.6 \pm 0.2	12.4 \pm 0.2	0.16
Not, % pigs/pen	62.8 \pm 1.2	61.9 \pm 1.2	0.12